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Empirical Analysis of the Reusability of Object-Oriented Program Code in Open-Source Software

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Abstract : Measuring the reusability of Object-Oriented (OO) program code is important to ensure a successful and timely adaptation and integration of the reused code in new software projects. It has become even more relevant with the availability of huge amounts of open-source projects. Reuse saves cost, increases the speed of development and improves software reliability. Measuring this reusability is not s straight forward process due to the variety of metrics and qualities linked to software reuse and the lack of comprehensive empirical studies to support the proposed metrics or models. In this paper, a conceptual model is proposed to measure the reusability of OO program code. A comprehensive set of metrics is used to compute the most significant factors of reusability and an empirical investigation is conducted to measure the reusability of the classes of randomly selected open-source Java projects. Additionally, the impact of using inner and anonymous classes on the reusability of their enclosing classes is assessed. The results obtained are thoroughly analyzed to discover the real reusability potential of OO program code and the impact of nesting on it together with suggestions on how to improve this potential.

Keywords : Code reuse, Low Complexity, Empirical Analysis, Modularity, Software Metrics, Understandability.
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